

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A process for producing ~~a printed wiring board-forming sheet~~ a collapsed filled via hole comprising

placing an insulating resin sheet with or without a conductive material sheet on at least one surface of the resin sheet, and a conductive metal sheet having a thickness ~~the same as or~~ larger than the resin sheet in this order on a die hole provided in a metal mold; ~~and~~

punching ~~the resin sheet and~~ the conductive metal sheet with a punch ~~in such a way that~~ does not reach the resin sheet thereby producing a chip of the conductive metal to be formed by the punch, the chip of conductive metal is pressed into the resin sheet by the punch, whereby a through hole is formed in the resin sheet and the chip is inserted and remains in the through hole formed in the resin sheet by the punch to form a filled via hole with a first end and a second end; and

collapsing the first end and the second end of the filled via hole to externally spread like an umbrella thereby producing the collapsed filled via hole,

wherein the chip of conductive metal protrudes from both surfaces of the resin sheet by 10 to 500 μm .

2. (Currently Amended) A process for producing ~~a printed wiring board-forming sheet~~ a collapsed filled via hole comprising

placing an insulating resin sheet with or without a conductive material sheet on at least one surface of the resin sheet having a through hole, and a conductive metal sheet having a thickness ~~the same as or~~ larger than the resin sheet in this order on a die hole provided in a metal mold; ~~and~~

punching ~~the resin sheet and~~ the conductive metal sheet with a punch of substantially the same size as the through hole and set over the position corresponding to the

~~hole in such a way that thereby producing a chip of the conductive metal to be formed by the punch,~~ the chip of conductive metal is pressed into the resin sheet by the punch to form a filled via hole with a first end and second end, whereby the chip is inserted and remains in the through hole, wherein the punch does not reach the resin sheet; and

collapsing the first end and the second end of the filled via hole to externally spread like an umbrella thereby producing the collapsed filled via hole,

wherein the chip of conductive metal protrudes from both surfaces of the resin sheet by 10 to 500 μm .

3. (Withdrawn) A multi-layered printed wiring board comprising plural printed wiring boards laminated through insulating adhesive layers and press-bonded together, wherein each of the printed wiring boards comprises an insulating resin sheet having a wiring pattern formed on at least one surface thereof and a conductive metal filled in a through hole of the resin sheet, said conductive metal having such a protrusion at one or both ends thereof that passes through the hole and protrudes through the insulating adhesive layer from the aligned surface of the insulating resin sheet and the wiring pattern to connect the wiring pattern electrically with other wiring patterns of adjacent printed wiring boards.

4. (Withdrawn) The process for producing the multi-layered printed wiring board as claimed in claim 3, comprising laminating a plurality of printed wiring boards comprising an insulating resin sheet having a wiring pattern formed on at least one surface thereof and a conductive metal filled in a through hole of the resin sheet, said conductive metal having a protrusion at one or both ends thereof through insulating adhesive layers; and

press-bonding the printed wiring boards and adhesive layers together to allow the protrusion of the conductive metal passing through the hole and the insulating adhesive layer from the aligned surface of the insulating resin sheet and the wiring pattern to connect the wiring pattern electrically with other wiring patterns of adjacent printed wiring boards.

5. (Withdrawn) A printed wiring board-forming sheet comprising an insulating resin sheet, wherein the insulating resin sheet is made of at least one material

selected from the group consisting of polyimide, polyester, polypropylene, polyphenylene sulfide, polyvinylidene chloride, ethylene-vinyl alcohol copolymer, and bismaleimide triazine (BT) resin, having a through hole inserted and filled with a conductive metal chip of substantially the same shape as the hole, wherein the conductive metal chip is formed by punching at least one conductive metal sheet selected from the group consisting of a solder sheet, a solder-plated metal sheet and a copper alloy sheet; and

wherein the conductive metal chip inserted in the through hole of the insulating resin sheet is protruded from at least one surface of the resin sheet.

6. (Withdrawn) The printed wiring board-forming sheet as claimed in claim 5, wherein the conductive metal chip protruded from at least one surface of the resin sheet is electrically connected with a conductive material or wiring pattern of another printed wiring board.

7. (Currently Amended) ~~A process for producing the printed wiring board forming sheet comprising placing an insulating resin sheet with or without a conductive material sheet on at least one surface of the resin sheet, and a conductive metal sheet having a thickness the same as or larger than the resin sheet in this order on a die hole provided in a metal mold; and~~

~~punching the resin sheet and the conductive metal sheet with a punch in such a way that a chip of the conductive metal to be formed by the punch is inserted and remains in the through hole formed in the resin sheet by the punch; the collapsed via hole according to claim 1,~~ wherein the insulating resin sheet is made of at least one material selected from the group consisting of polyimide, polyester, polypropylene, polyphenylene sulfide, polyvinylidene chloride, ethylene-vinyl alcohol copolymer, and bismaleimide triazine (BT) resin, and the conductive metal is at least one conductive metal selected from the group consisting of a solder sheet, a solder-plated metal sheet and a copper alloy sheet.

8. (Currently Amended) ~~A process for producing the printed wiring board forming sheet comprising placing an insulating resin sheet with or without a conductive material sheet on at least one surface of the resin sheet having a through hole, and~~

~~a conductive metal sheet having a thickness the same as or larger than the resin sheet in this order on a die hole provided in a metal mold; and~~

~~punching the resin sheet and the conductive metal sheet with a punch of substantially the same size as the through hole and set over the position corresponding to the hole in such a way that a chip of the conductive metal to be formed by the punch is inserted and remains in the through hole; the collapsed via hole according to claim 2,~~ wherein the insulating resin sheet is made of at least one material selected from the group consisting of polyimide, polyester, polypropylene, polyphenylene sulfide, polyvinylidene chloride, ethylene-vinyl alcohol copolymer, and bismaleimide triazine (BT) resin, and the conductive metal is at least one conductive metal selected from the group consisting of a solder sheet, a solder-plated metal sheet and a copper alloy sheet.

9. (Currently Amended) A process for producing ~~a printed wiring board-forming sheet~~ a collapsed filled via hole comprising:

(A) placing an insulating resin sheet, optionally including a conductive material sheet on at least one surface of the resin sheet, in a die hole provided in a metal mold;

(B) placing a conductive metal sheet having a thickness ~~the same as or~~ larger than the resin sheet in the die hole; ~~and~~

(C) ~~punching the resin sheet in (A) and the metal sheet in (B) with a punch in such a way that~~ that does not reach the resin sheet thereby producing a chip of the metal sheet in (B) to be formed by the punch, the chip of the metal sheet in (B) is pressed into the resin sheet in (A) by the punch, whereby a through hole is formed in the resin sheet in (A) and the chip is inserted and remains in the through hole formed in the resin sheet by the punch to form a filled via hole with a first end and a second end; and

(D) collapsing the first end and the second end of the filled via hole to externally spread like an umbrella thereby producing the collapsed filled via hole,

wherein the chip of conductive metal protrudes from both surfaces of the resin sheet by 10 to 500 μm .

10. (Original) The process of claim 9, wherein the resin sheet in (A) is made of at least one material selected from the group consisting of polyimide, polyester, polypropylene, polyphenylene sulfide, polyvinylidene chloride, ethylene-vinyl alcohol copolymer, and bismaleimide triazine (BT) resin.

11. (Original) The process of claim 9, wherein the conductive metal sheet in (B) comprises one or more metals selected from the group consisting of a solder sheet, a solder-plated metal sheet and a copper alloy sheet.

12. (Original) The process of claim 9, wherein a conductive material layer is formed on at least one surface of the insulating resin sheet and the conductive material layer and the conductive metal chip are connected electrically with each other.